MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2019/2020

TCP2201 – Object Oriented Analysis and Design

(All Sections / Groups)

9 March 2020
9.00 AM– 11.00AM
(2 Hours)

INSTRUCTIONS TO STUDENT

1. Answer **ALL** questions.
2. This question paper has 5 printed pages excluding the front cover.
3. Please print all your answers in the answer booklet provided.

QUESTION 1 [25 marks]

a) Suppose you have defined a class such as the following for use in a program:

```
public class YourClass
{
        private int information;
        private char moreInformation;
        public YourClass(int newInfo, char moreNewInfo)
        {
              <Details not shown.>
        }
       public YourClass()
        {
              <Details not shown.>
        }
       public void doStuff()
       {
              <Details not shown.>
       }
}
```

Which of the following are legal in a program that uses this class?

YourClass anObject = new YourClass(42, 'A');	[2 marks]
YourClass anotherObject = new YourClass(41.99, 'A');	[2 marks]
YourClass yetAnotherObject = new YourClass();	[2 marks]
yetAnotherObject.doStuff();	[2 marks]
YourClass oneMoreObject;	[2 marks]
oneMoreObject.doStuff();	[2 marks]
oneMoreObject.YourClass(99, 'B');	[2 marks]

b) Can you have a variable of an interface type? Can you have a parameter of an interface type? Explain your answer. [4 marks]

c) Can an abstract class ever implement an interface? Explain your answer. [2 marks]

d) Can a derived class have two base classes? Can it implement two interfaces? [5 marks]

Continued .....

QUESTION 2 [25 marks]

Write a program that meets the following requirements.

a) Define a class named Person that contains two instance variables of type String that stores the first name and last name of a person and appropriate accessor and mutator methods. Apply appropriate assess modifies to the instance variables.

[9 marks]

b) Also create a method named displayDetails that outputs the details of a person (i.e. the first and last names).

[2 marks]

c) Next, define a class named Student that is derived from Person, the constructor for which should receive first name and last name from the class Student and also assigns values to student id, course, and teacher name. This class should redefine the displayDetails method to person details as well as details of a student. Include appropriate constructor(s).

[14 marks]

Note: Write only ONE program to include all the requirements above.

Continued .....

QUESTION 3 [25 marks]

a) Which design pattern is used to get a way to access the elements of a collection object in sequential manner? Provide an example UML class diagram design of the design pattern.

[8 marks]

b) When do you use Observer pattern in Java? Provide an example UML class diagram design of the design pattern.

[8 marks]

c) You plugin the memory card into card reader and card reader into the laptop so that memory card can be read via laptop. What design pattern should be used in this scenario? Provide a generic example UML class diagram design for the design pattern you identified.

[9 marks]

Continued .....

QUESTION 4 [25 marks]

a) In the interface segregation principle, clients should not be forced to depend upon interfaces that they don't use. Explain why such principle is important. In your explanation, provide an example code to illustrate your opinion.

[9 marks]

b) Translate the following Java code snippets into its equivalent UML class diagram. Ensure that the correct access specifiers are used during the conversion to support the encapsulation properties of OOP. [8 marks]

i)

```
public class OwnedClass{
     // body here
}

public class OwnerClass{
     private OwnedClass associatedClass;
     public OwnerClass otherClass;
     // body here
}
```

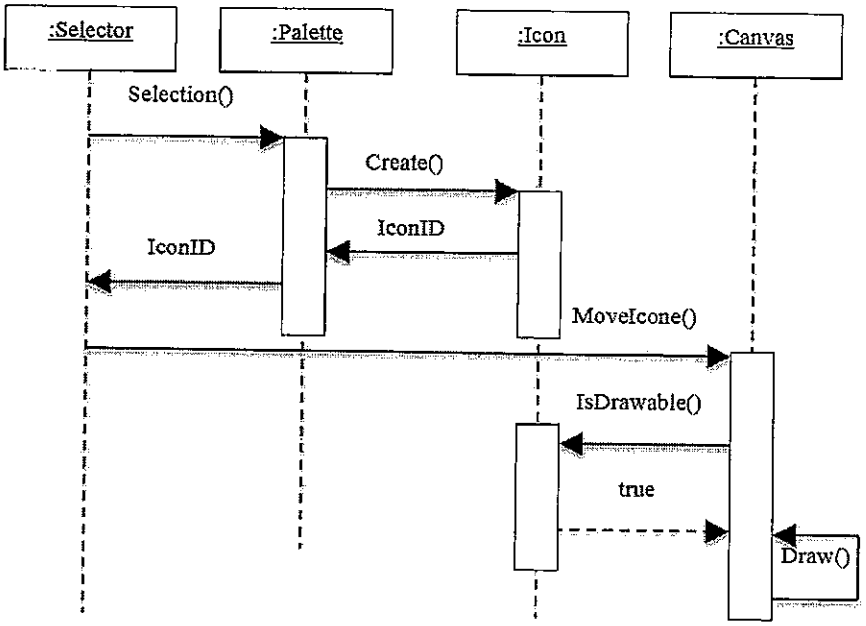
ii)

```
public class User{
     private String email;
     public String getEmail(){return email;}
     public void setEmail(String add){email=add;}
}

public class Owner extends User{
     private int maxNum;
     public int getMaxNum(){return maxNum;}
}
```

Continued .....

c) Convert the sequence diagram below to a collaboration diagram [8 marks]



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